

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



10/539539



(43) International Publication Date
15 July 2004 (15.07.2004)

PCT

(10) International Publication Number
WO 2004/058679 A3

- (51) International Patent Classification⁷: C07C 65/24, 65/40, A61K 31/185, A61P 25/00
- (21) International Application Number: PCT/US2003/041211
- (22) International Filing Date: 19 December 2003 (19.12.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/435,420 20 December 2002 (20.12.2002) US
- (71) Applicant (for all designated States except US): MITOKOR, INC. [US/US]; 11494 Sorrento Valley Road, San Diego, CA 92121 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): GHOSH, Soumitra, S. [US/US]; 12334 Pathos Lane, San Diego, CA 92129 (US). PEI, Yazhong [CN/US]; 5185 Seachase Street, San Diego, CA 92130 (US). TANG, Xiao-Qing [CN/US]; 11861 Ramsdell Court, San Diego, CA 92139 (US). LIRAS, Spiros, J. [GR/US]; 12 Kidds Way, Stonington, CT 06378 (US). AHLJANIAN, Michael, K. [US/US]; 5 Stanton Place, Mystic, CT 06355 (US).
- (74) Agents: WAGNER, Emily, W. et al.; Seed Intellectual Property Law Group PLLC, Suite 6300, 701 Fifth Avenue, Seattle, WA 98104-7092 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 26 August 2004
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: LIGANDS OF ADENINE NUCLEOTIDE TRANSLOCASE (ANT) AND COMPOSITIONS AND METHODS RELATED THERETO

(57) Abstract: Compounds which have utility in the treatment of conditions associated with altered mitochondrial function. The compounds having structure (I), including stereoisomers, prodrugs, and pharmaceutically acceptable salts thereof, wherein R₁, R₂, R₃, R₄, R₅ and R₆ are as defined herein. Pharmaceutical compositions containing a compound of structure (I), as well as methods relating to the use thereof, are also disclosed.

WO 2004/058679 A3

INTERNATIONAL SEARCH REPORT

International Application No

03/41211

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07C65/24 C07C65/40 A61K31/185 A61P25/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BEILSTEIN Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 253 666 A (FUJI PHOTO FILM CO LTD) 20 January 1988 (1988-01-20) page 15; compound 14	1, 10
A	CH 443 350 A (BOEHRINGER & SOEHNE GMBH) 15 September 1967 (1967-09-15) the whole document	1, 18-20

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

22 June 2004

Date of mailing of the international search report

30/06/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bonnevalle, E

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US 03/41211

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
Although claims 19-20 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP03/41211

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0253666	A	20-01-1988	JP 1919537 C	07-04-1995
			JP 6049392 B	29-06-1994
			JP 63022683 A	30-01-1988
			JP 63028691 A	06-02-1988
			JP 63095977 A	26-04-1988
			JP 63095978 A	26-04-1988
			JP 63095979 A	26-04-1988
			EP 0253666 A2	20-01-1988
			US 4918047 A	17-04-1990
CH 443350	A	15-09-1967	DE 1198831 B	19-08-1965
			DE 1216293 B	12-05-1966
			AT 243785 B	25-11-1965
			AT 243786 B	25-11-1965
			CH 479526 A	15-10-1969
			DK 109147 C	25-03-1968
			DK 109782 C	01-07-1968
			FI 40720 B	31-01-1969
			FI 42093 B	02-02-1970
			GB 966479 A	12-08-1964
			LU 43384 A1	20-05-1963
			SE 312142 B	07-07-1969
			US 3277164 A	04-10-1966